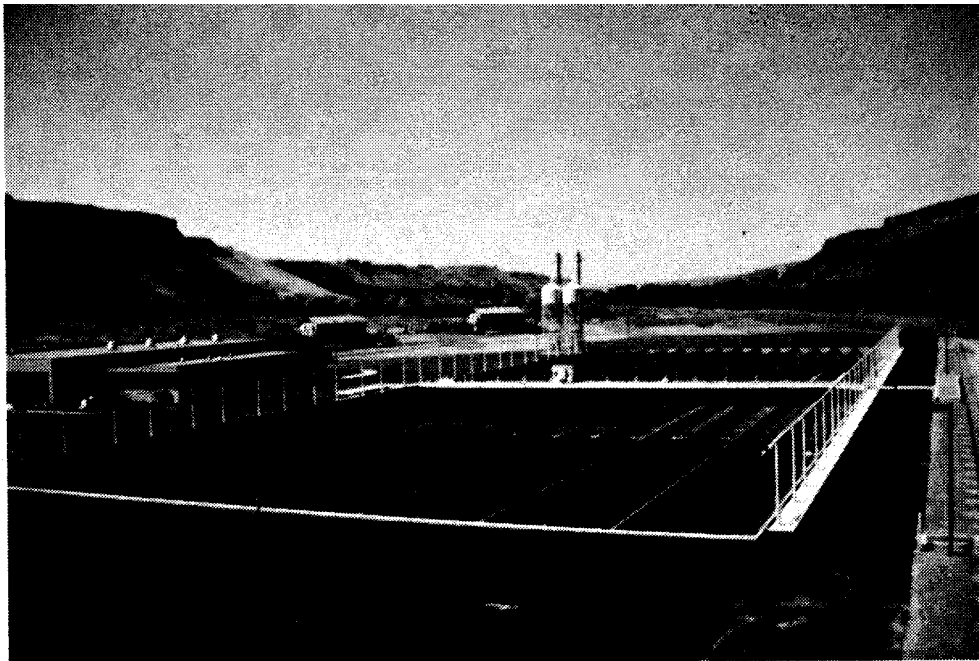




MAGIC VALLEY

1988 Steelhead Brood Year Report



by

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ABSTRA

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ABSTRA

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Two years of steelhead production at Magic Valley Hatchery has occurred since the completion of construction in July 1987. In 1988, the hatchery received 2,047,748 A-strain eyed steelhead eggs (Pahsimeroi stock) and 357,506 B-strain steelhead eggs (East Fork Salmon River stock) from Sawtooth Hatchery. These fish were reared for ten months and fed 703,373 pounds of feed for a conversion of 1.38. In April 1989, 1,849,500 A-strain steelhead smolts weighing 430,300 pounds, 8.4 inch (4.3 per pound), and 353,300 B-strain smolts weighing 78,800 pounds, 8.3 inch (4.48 per pound), were stocked in the Salmon River and its tributaries.

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ABSTRA

INTRODUCTION

Magic Valley Steelhead Hatchery completed its second year of production as the latest steelhead hatchery constructed in Idaho by the U.S. Army Corps of Engineers. The hatchery is part of the Lower Snake River Fish and Wildlife Compensation Plan (LSRCP), compensating for losses of anadromous fish caused by the Lower Snake River dams. Constructed by the Corps of Engineers, the hatchery is funded by the U.S. Fish and Wildlife Service and operated by the Idaho Department of Fish and Game.

LOCATION

The hatchery is located in Twin Falls County, seven miles northwest of Filer in the Snake River Canyon near the mouth of Cedar Draw Creek. The hatchery's 125 cfs of 59°F water is piped from Crystal Springs on the north shore of the Snake River, across the river to the hatchery site.

OBJECTIVES

1. To hatch and rear two million "A" and "B" strain steelhead trout smolts per year for stocking in the Salmon River and its tributaries.
2. Evaluate fish rearing capabilities of Magic Valley Hatchery.

HATCHERY FACILITIES

The hatchery building houses the incubation early rearing room with 40 upwelling incubators, 20 concrete tanks (4 ft x 3 ft x 40 ft), 2 fiberglass troughs (2 ft x 1 ft x 12 ft) and 60 automatic fry feeders. The building contains an office, laboratory, wet laboratory, shop, dormitory, enclosed storage room, covered vehicle storage area, feed storage room, walk-in freezer and mechanical room for water pumps, water chiller, and domestic water supply system. There are 32 outdoor rearing raceways (10 ft x 3 ft x 200 ft) spanned by a movable bridge equipped with automatic fish feeders. Two 30,000 pound bulk feed bins, two fish feed fines shakers, and a fish feed conveyor comprise the remainder of the feeding system. The hatchery effluent water is treated using two waste water settling ponds, a cleaning waste pond, and a hatchery flow-thru waste pond. The spring collection facility on the north side of the Snake River collects the water in a concrete channel system and delivers the water to a central collection tank. A 42-inch pipeline carries the water across the river to the hatchery site. There are four residences on the hatchery grounds for housing the permanent personnel.

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FISH PRODUCTION

Raceway and hatchery tank capacities, density index, and flows were established during the first year of production. The hatchery received 2,047,748 (Pahsimeroi stock) A-strain eyed steelhead eggs from Sawtooth Hatchery and 357,506 (East Fork stock) B-strain eyed steelhead eggs from Sawtooth Hatchery the last week of May and first week of June.

The fish that emerged from the upwelling incubators were started on Rangen's soft moist fry feed. They were fed on the soft moist diet for three weeks and then changed to Clear Springs dry trout production diet for four months. The remainder of the rearing cycle they were fed on Rangen's dry trout production diet. The only exception was a feed experiment comparing Clear Springs dry trout production diet with Rangen's dry salmon diet and Rangen's dry trout production diet.

Haskell's (1967) feeding rate formula was used to calculate the daily feed ration ($\% \text{ body weight} = \text{food conversion factor} \times \text{daily length of fish} \times 3 \times 100 / \text{length in inches of fish}$). The feeding rate was calculated using a growth rate of .026 inches per day, starting with 1-inch fish (swim-up fry) and ending with an 8.3-inch smolt. Fish responded well to this feeding schedule and maintained the .8-inch per month growth rate throughout the rearing period (Figure 1). A total of 703,373 pounds of feed were fed to produce 509,100 pounds of fish; a feed conversion of 1.38.

Piper's (1970) formulas for density index ($\text{weight of fish} / \text{length of fish} \times \text{cubic feet of water}$) and flow index ($\text{weight of fish} / \text{length of fish} \times \text{gpm flow}$) were used to calculate the densities and flows for each tank or raceway. Raceways never exceeded the desired .25 density index or 1.25 flow index until the month prior to release, when some of the raceways reached a .36 density and a 1.4 flow index without any detrimental effect on the fish (Table 1). The water flows from the springs were lower this year than the previous year, with the low flow for Brood Year 1987 at 110 cfs and this year 103 cfs (Figure 2). Fish in hatchery tanks were transferred to the outside raceways when they reached a density of .25 and attained a 2.0-inch (330/lb.) size.

The 1988 brood year started with 2,047,748 A-strain steelhead eggs and ended with 1,849,500 steelhead smolts (90.3% survival), weighing 430,300 pounds and 4.3 per pound (8.4 inch). Also, the brood year started with 357,506 East Fork B-strain steelhead eggs and ended with 353,300 steelhead smolts (98.8% survival), weighing 78,800 pounds and 4.48 per pound (8.3 inch). Smolts were transported to the Salmon River and its tributaries during April 1989 (Table 2).

FISH DISEASE

Fish Pathologist Scott Foott sampled fish monthly and found disease pathogens of IPN, IHN, soreback, and bacterial infection. Very little mortality could be attributed to these pathogens. A bacterial infection caused some early

EAST FORK VS PAHSIMEROI LENGTH INCREASE

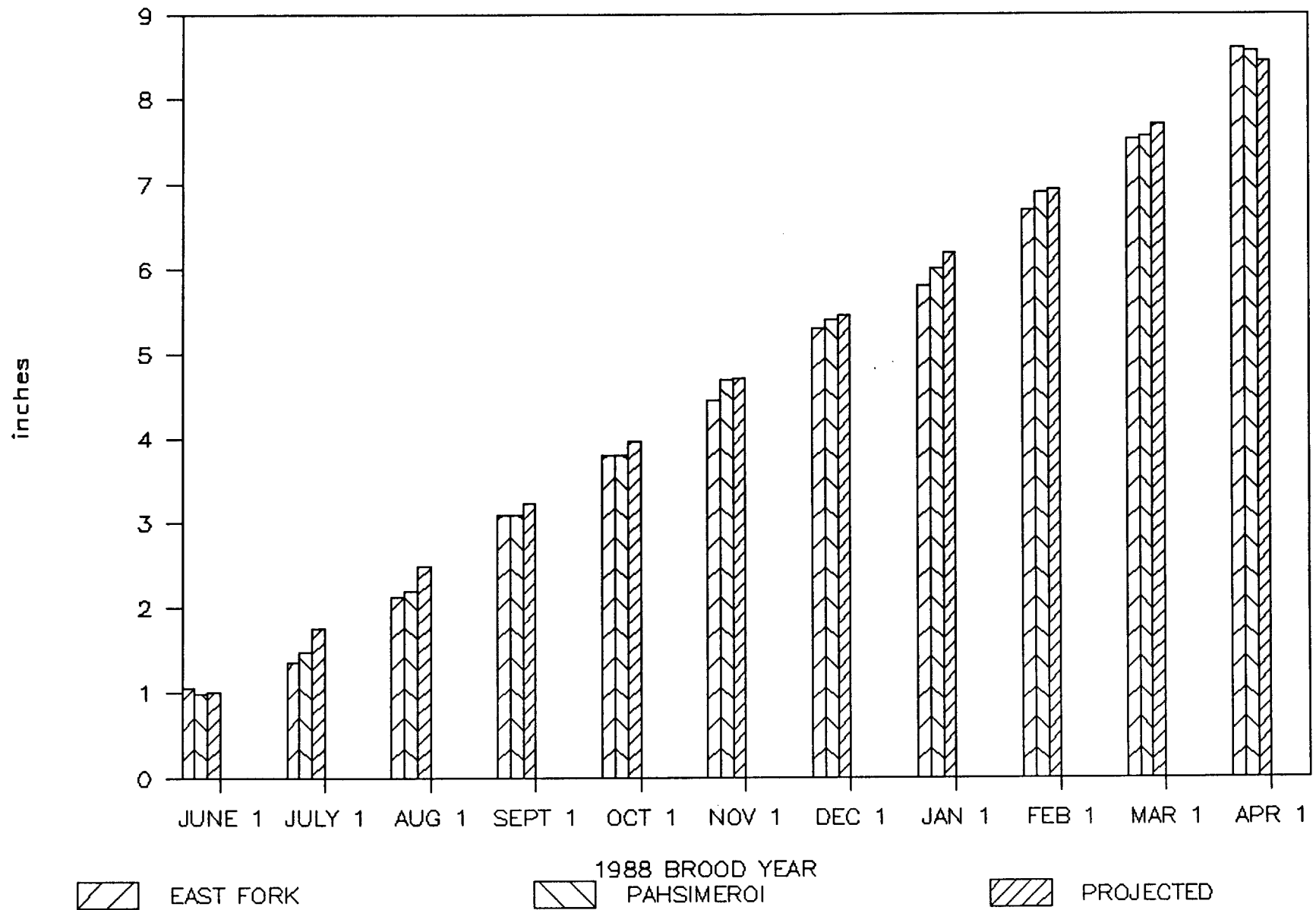


Figure 1. Magic Valley Hatchery 1988 Brood Year monthly growth plotted with projected growth for Pahsimeroi and East Fork stocks of A-strain and B-strain steelhead, respectively.

MAGIC VALLEY HATCHERY

FLOW IN CFS FROM CRYSTAL SPRINGS

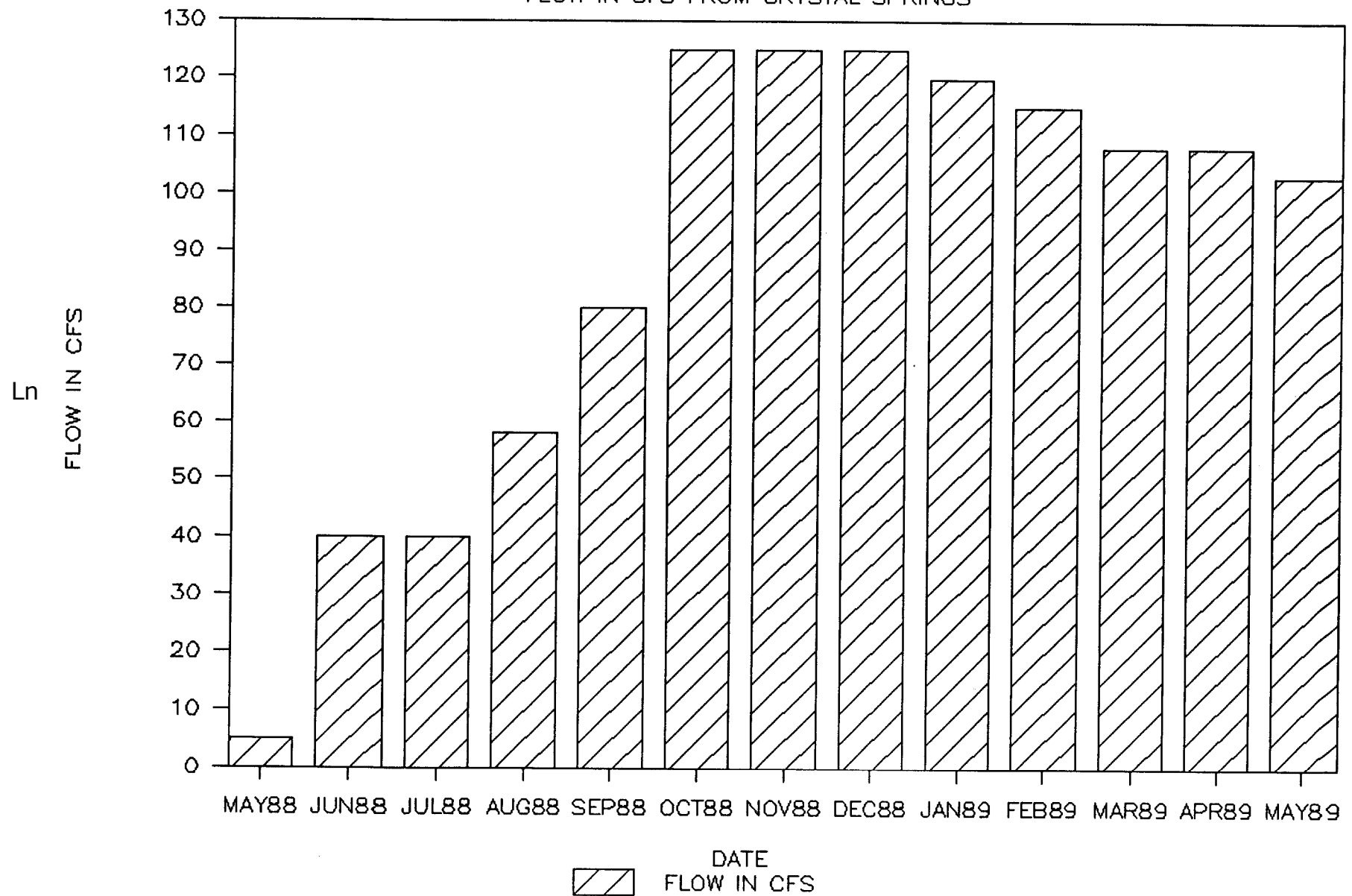


Figure 2. Magic Valley Hatchery monthly flows in cfs from Crystal Springs.

Table 1. Final raceway inventory and indices for Magic Valley
Hatchery A-strain and B-strain steelhead trout.

Raceway	Strain	Fish numbers	Weight (lbs.)	Number per lb.	Flow index	Density index
1	A	158,500	36,850	4.30	1.41	0.37
2	A	153,131	35,650	4.30	1.38	0.36
3	A	147,768	33,125	4.46	1.38	0.36
4	A	154,095	36,200	4.26	1.37	0.36
5	A	148,917	31,225	4.77	1.28	0.33
6	A	141,659	30,875	4.59	1.30	0.34
7	A	136,595	31,025	4.40	1.30	0.34
8	A	136,798	31,425	4.35	1.32	0.35
9	A	131,288	32,700	4.01	1.30	0.34
10	B	106,328	24,500	4.34	0.91	0.24
11	B	107,434	23,725	4.53	0.98	0.26
12	B	139,538	30,575	4.56	1.20	0.31
13	A	131,717	31,625	4.16	1.23	0.32
14	A	149,488	35,550	4.21	1.24	0.32
15	A	136,813	33,700	4.06	1.28	0.33
16	A	122,731	30,350	4.04	1.25	0.33
TOTAL A's		1,849,500	430,300	4.30	1.31	0.34
TOTAL B's		353,300	78,800	4.48	1.03	0.27
GRAND TOTALS		2,202,800	509,100	4.33	1.26	0.33

Table 2. Steelhead smolt distribution in the Salmon River and
tributaries.

Destination	Weight	Number per lb.	Number released
East Fork Salmon	78,800	4.48	353,300
Hammer Creek	33,700	4.04	136,000
Hazard Creek	106,85	4.23	450,900
Sawtooth Hatchery	192,95	4.44	857,600
Slate Creek	72,525	4.14	300,600
Yankee Fork	24,275	4.30	104,400
GRAND TOTAL	509,100	4.33	2,202,800

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mortality in the hatchery tanks, but the fish were fed medicated feed and mortality subsided. Soreback was present in the fish in the outside raceways but caused negligible loss, and an increase in feed appeared to help this situation.

FISH MARKING

Fin Clipping

All of Idaho's hatchery steelhead are required to have an adipose fin clip identifying them from wild steelhead. At Magic Valley Hatchery, the fin clipping crews clipped 2,300,910 fish during September and October. Fin clipping attributed to a 0.041 mortality rate. Personnel randomly sampled the population of fish prior to stocking and found 99.4% had an acceptable fin clip.

Coded Wire Tagging

Two groups of steelhead were coded wire-tagged this year. The first group of 48,580 of A-strain steelhead (Pahsimeroi Stock) were tagged in November, and 46,290 were released in the Little Salmon River in April. The second group of 47,299 B-strain steelhead (East Fork Stock) were tagged in December, and 44,064 were released in the East Fork Salmon River in April.

PIT Tagging

Three groups of steelhead were pit-tagged this year. The first group of 3,061 A-strain steelhead (Pahsimeroi stock) were tagged in January, and 3,058 were released in the Little Salmon River. The second group of 2,841 A-strain steelhead (Pahsimeroi stock) were tagged in March, and 2,838 were released in the Upper Salmon River at Sawtooth Hatchery. The third group of 2,931 B-strain steelhead (East Fork stock) were tagged in March and 2,930 were released in the East Fork Salmon River.

SPECIAL STUDIES

The hatchery conducted a feeding experiment comparing three types of fish feed. Rangen's dry salmon diet and Clear Springs dry trout diet (Idaho trout diet formula) were used specifically, and because the Rangen's dry trout diet (contract fish feed) was used for normal production, it was included in the study as a comparison. The normal production contract diet was Clear Springs trout diet for the first two months, and Rangen's trout diet for the remainder of the study.

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Initially, the fish were moved to the outside raceways and started on their respective diets September 1 at 3.0- to 3.3-inch length and 77 to 97 per pound. The fish from two raceways were used for each diet, and the fish in each raceway were sample-counted twice per month and the feed adjusted. Because of the larger raceways, it was found that at least twice during the course of the experiment our sample counts were off in the Clear Springs diet, and this caused the feed amount to vary and affected the growth proportionately. The experiment started September 1 and ended March 1. Comparing all three feeds, considering the biased sample counts, it was found there was not any appreciable difference in the fish fed the three diets (appearance, fins, and conversion). The only difference was in the cost of the salmon diet as compared to the trout diet. All of the fish were treated the same way. Figure 3 and Table 3 indicate the results of the feed experiment.

HATCHERY MAINTENANCE

After two years of operation a few "bugs" were found in the equipment. The moveable feeding bridge had guide wheel bearing and electrical circuit board problems. These and a few other problems will be taken care of by the Corps of Engineers in the clean-up contract. Some ongoing repairs include the lawn sprinkling system and minor repair on the electrical systems and fish feeders.

STAFFING

The hatchery is staffed with four permanent employees: Hatchery Superintendent III, Hatchery Superintendent II, Fish Culturist, and Roving Fish Culturist. Several temporary positions of Bio-aides and Laborers are employed at various times of the year to assist with fish cultural duties during peak production, transportation, and in the absence of the Roving Fish Culturist.

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EXPERIMENTAL LENGTH INCREASES

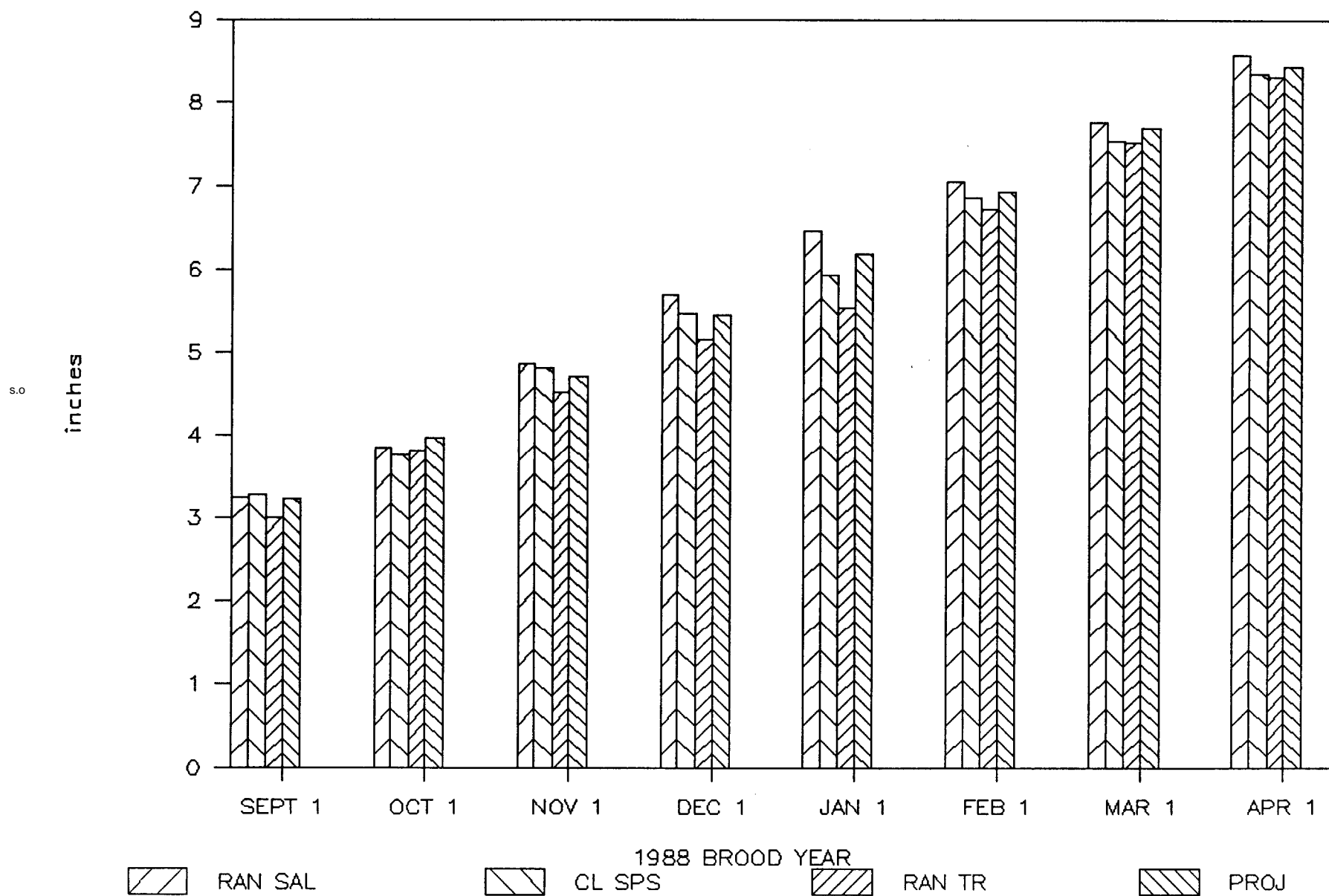


Figure 3. Magic Valley Hatchery 1988 Brood Year experimental feed monthly growth increases plotted with projected growth for Rangen's salmon diet, Clear Springs trout diet, and Rangen's trout diet.

Table 3. Feeding experiment comparing Rangen's dry salmon diet, Clear Springs dry trout diet, and Rangen's dry trout diet.

Diet	Starting fish numbers	Starting weight	Number per pound	Starting length (inches)
Rangen's Salmon	315,100	3,857	77	3.30
Clear Sps. Trout	316,040	3,955	75	3.30
Rangen's Trout	315,144	3,024	97	3.00

Results of feed experiment

Diet	Ending fish numbers	Ending weight	Number per pound	Ending length (inches)
Rangen's Salmon	300,899	65,986	4.56	8.58
Clear Sps. Trout	303,012	62,605	4.84	8.17
Rangen's Trout	278,254	61,900	4.50	8.60

Diet	Pounds food fed	Feed cost	Conversion
Rangen's Salmon	66,121	21,170	1.18
Clear Sps. Trout	61,169	15,345	1.17
Rangen's Trout	59,060	14,972	1.05

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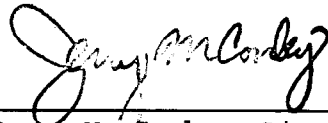
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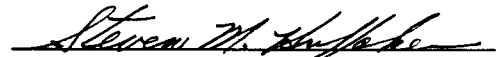
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